

What is claimed is:

1. A power module comprising:

a substrate with a power semiconductor device mounted thereon;

5 a case having an interior in which said substrate is disposed;

an N-terminal and a P-terminal arranged along a first side of a main surface of said case and electrically connected to said power semiconductor device; and

10 a smoothing capacitor having a first electrode connected to said N-terminal and a second electrode connected to said P-terminal for smoothing a voltage to be externally supplied to said power semiconductor device,

wherein said smoothing capacitor has a main surface level with said main surface of said case, and is disposed in contact with a side surface of said case including said first side of said main surface of said case, and

15 wherein said first electrode and said second electrode are disposed on said main surface of said smoothing capacitor and in proximity to said N-terminal and said P-terminal, respectively.

2. The power module according to claim 1,

wherein said smoothing capacitor comprises:

20 an enclosure;

a plurality of capacitor elements disposed in said enclosure, each of said plurality of capacitor elements having a first electrode abutting against said first electrode of said smoothing capacitor and a second electrode abutting against said second electrode of said smoothing capacitor; and

25 a hold-down plate for pressing said plurality of capacitor elements against said

enclosure to fix said plurality of capacitor elements in said enclosure.

3. The power module according to claim 2,  
wherein said enclosure has a single heat sink for dissipating heat generated by  
5 said plurality of capacitor elements.

4. The power module according to claim 2,  
wherein at least one of said first and second electrodes of said smoothing  
capacitor has elasticity.

10

5. The power module according to claim 1,  
wherein said smoothing capacitor is a ceramic capacitor.

15

6. A power module comprising:  
a substrate with a power semiconductor device mounted thereon;  
a case having an interior in which said substrate is disposed, said case including  
a predetermined recess in an outer surface thereof;

an N-terminal and a P-terminal disposed on side walls of said recess and  
electrically connected to said power semiconductor device; and

20

a smoothing capacitor fitted in said recess and having a first electrode  
positioned to correspond to said N-terminal and a second electrode positioned to  
correspond to said P-terminal for smoothing a voltage to be externally supplied to said  
power semiconductor device.

25

7. The power module according to claim 6,

wherein there is provided at least one of a first electrically conductive elastic member between said first electrode and said N-terminal and a second electrically conductive elastic member between said second electrode and said P-terminal.

5           8. The power module according to claim 6,  
          wherein said smoothing capacitor is a ceramic capacitor.

          9. A power module comprising:  
          a first substrate with a power semiconductor device mounted thereon;  
10       a second substrate with a control circuit for controlling said power  
          semiconductor device formed thereon;

          a smoothing capacitor electrically connected to said power semiconductor  
          device for smoothing a voltage to be externally supplied to said power semiconductor  
          device; and

15       a case including a case frame and a case lid, said case having an interior in  
          which said first substrate, said second substrate and said smoothing capacitor are  
          disposed.

          10. The power module according to claim 9,  
20       wherein said smoothing capacitor is disposed on said case lid.

          11. The power module according to claim 9, further comprising  
          a shield plate disposed between said first substrate and said second substrate  
          and fixed to said case frame,  
25       wherein said smoothing capacitor is disposed on said shield plate.

12. The power module according to claim 11, further comprising  
a thermally conductive sheet formed between said shield plate and said  
smoothing capacitor.

5

13. The power module according to claim 11,  
wherein said shield plate is a metal shield plate.

10

14. The power module according to claim 9,  
wherein said smoothing capacitor is disposed on said first substrate.

15. The power module according to claim 14,  
wherein said first substrate and said smoothing capacitor are made of the same  
material.

15

16. The power module according to claim 9, further comprising  
a heat sink for dissipating heat generated from said first substrate, said first  
substrate and said case frame being placed on said heat sink,  
wherein said smoothing capacitor is disposed on said heat sink.

20

17. The power module according to claim 9,  
wherein said smoothing capacitor is a ceramic capacitor.